

AMENDMENTS TO THE CLAIMS

Listing of Claims

The following listing of claims replaces all prior versions and listings of claims in the application.

1. (Currently amended): An ignition device for internal combustion engine comprising:
 - a main chamber (1) intended for containing a main combustible mixture and fitted with a compression system of said mixture; and
 - an igniter (11) comprising a precombustion chamber (2) intended for containing a combustible mixture and an ignition system (13, 14) of the combustible mixture contained in the precombustion chamber (2), the precombustion chamber being defined by a precombustion chamber body (12) having a head (12a) including passageways (15a—15i), the head (12a) of the pre-heating body (12) separating the precombustion chamber (2) from the main chamber (1) and communicating the precombustion chamber (2) and the main chamber (1) through the passageways (15a—15i), ~~characterised in that~~ wherein the passageways comprise at least one passageway (15a) enabling the propagation of a flame front from the precombustion chamber (2) to the main chamber (1) when the engine operates on low load and at least one passageway not enabling the propagation of a front flame from the precombustion chamber (2) to the main chamber (1) while enabling the passageway of the precombustion chamber (2) to the main chamber (1) of unstable compounds derived from the combustion of the combustible mixture in the precombustion chamber (2).
2. (Currently amended): A device according to claim 1, ~~characterised in that~~ wherein the number of passageways enabling the propagation of a flame front provided in the head (12a) of the precombustion chamber body (12) is 1 to 5, preferably 1.
3. (Currently amended): A device according to ~~claim 1 or 2,~~ claim 1, ~~characterised in that~~ wherein the number of passageways not enabling the propagation of a flame front is 1 to 20, preferably 3 to 15.

4. (Currently amended): A device according to ~~any of the previous claims, characterised in that~~ claim 1, wherein the passageway(s) enabling the propagation of a flame front have a diameter greater than 1 mm up to 3 mm, preferably up to 1.5 mm.

5. A device according to ~~any of the previous claims, characterised in that~~ claim 1, wherein the passageways not enabling the propagation of a flame front have a diameter ≤ 1 mm, preferably 0.5 to 1 mm.

6. (Currently amended): A device according to ~~any of the previous claims, characterised in that~~ claim 1, wherein the head (12a) of the precombustion chamber body (12) has the shape of a spherical cap.

7. (Currently amended): A device according to claim 6, ~~characterised in that~~ wherein the passageways (15a—15i) are oriented following radii of the spherical cap.

8. (Currently amended): A device according to ~~any of the previous claims, characterised in that~~ claim 1, wherein the precombustion chamber body (12) is a metal alloy having a thermal conductivity at 20°C of at least 10 W/K/m, preferably at least 30 W/K/m.

9. (Currently amended): A device according to claim 8, ~~characterised in that~~ wherein the alloy is a copper alloy.

10. (Currently amended): A device according to claim 9, ~~characterised in that~~ wherein the alloy is the alloy Cu Cr 1 Zr.

11. (Currently amended): A device according to ~~any of the claims 1 to 7, characterised in that~~ claim 1, wherein the internal wall of the precombustion chamber body (12) and/or the external wall of the head (12a) of the precombustion chamber body (12) and/or the walls of the passageways (15a—15i) are coated with a refractory coating layer.

12. (Currently amended): A device according to claim 11, ~~characterised in that~~ wherein the refractory coating layer is selected among: Al₂O₃, ZrY and TiB₂.

13. (Currently amended): A device according to ~~claim 11 or 12, characterised in that~~ claim 11, wherein the refractory coating layer has a thickness of 0.5 to 100 μm , preferably 1 to 50 μm .

14. (Original): A method for igniting an internal combustion engine wherein:

- a main combustible mixture is introduced into a main chamber and a combustible mixture in a precombustion chamber communicating with the main chamber through at least one passageway enabling the propagation of a flame front and at least one passageway not enabling the propagation of a flame front ;
- the combustible mixture contained in the precombustion chamber is burnt; and
 - a) for low load operation of the engine:
 - at least one flame front is let through from the precombustion chamber to the main chamber via the passageway enabling the propagation of a flame front and the main combustible mixture is ignited via the flame front ;
 - b) for high load operation of the engine ;
 - unstable compounds from the combustion of the combustible mixture from the precombustion chamber while preventing any propagation of a flame front, are passed from the precombustion chamber to the main chamber, via the passageways, and the main combustible mixture seeded with the unstable compounds undergoes mass self-ignition in the main chamber.

15. (Currently amended): An igniter for combustion engine comprising a precombustion chamber defined by a precombustion chamber body having a head fitted with passageways, the precombustion chamber being intended for containing a combustible mixture, and an ignition system of the combustible mixture contained in the precombustion chamber, ~~characterised in that~~ wherein the precombustion chamber head comprises at least one passageway having a diameter greater than 1 mm up to 3 mm, preferably up to 1.5 mm, and at least one passageway having a diameter equal to or smaller than 1 mm, preferably 0.5 to 1 mm.

16. (Currently amended): An igniter according to claim 15, ~~characterised in that~~ wherein the precombustion chamber head comprises 1 to 5 passageways of diameter greater than 1 mm, preferably 1.

17. (Currently amended): An igniter according to ~~claim 15 or 16, characterised in that~~ claim 15, wherein the precombustion chamber head comprises 1 to 20 passageways of diameter smaller than or equal to 1 mm, preferably 3 to 15.

18. (Currently amended): An igniter according to ~~any of the claims 15 to 17, characterised in that~~ claim 15, wherein the precombustion chamber head is a spherical cap.

19. (Currently amended): An igniter according to claim 18, ~~characterised in that~~ wherein the passageways are oriented following radii of the spherical cap.